

NASA TECH BRIEF

Ames Research Center

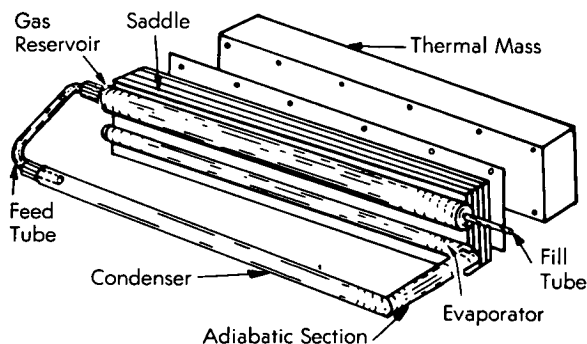


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Heat Pipe with Hot Gas Reservoir

The problem:

To remove condensed vapor from the gas reservoir of a heat pipe which is controlled by a condensable gas.



The solution:

Use a heat pipe of hair-pin design with its reservoir thermally coupled to an external evaporator.

How it's done:

As shown in the diagram, the reservoir is external to the evaporator, but because both the reservoir and the evaporator are set in an aluminum saddle-like base, the reservoir operates at a temperature slightly greater than the evaporator. Thus, the heat pipe can reverse itself with the gas reservoir acting as the evaporator, leading to rapid recovery from liquid in the reservoir. Additionally, there is included a single layer of fine-mesh screen inside the reservoir to assure uniform liquid distribution over the hottest parts of the internal surface until the liquid is completely removed; the screen is not in contact with the primary wick of the heat pipe itself.

The heat pipe has a single zone condenser with very low radial wick resistance. The wick structure consists of inner circumferential grooves cut into the stainless steel tube and an axial, homogeneous metal-

felt wick located across the diameter. For better control of the mass transfer between the reservoir and condenser, the feed tube is capped and 0.8-mm diameter holes are drilled in the last 6-mm length of the tube; the holes are large enough to prevent formation of significant capillary head because of liquid "bridging."

Notes:

1. The following documentation may be obtained from:
National Technical Information Service
Springfield, Virginia 22151
Single copy price \$3.00
(or microfiche \$0.95)
Reference: NASA CR-114530 (N73-15957),
Theory and Design of Variable Conductance
Heat Pipes.
2. No additional documentation is available. Specific questions, however, may be directed to:
Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B74-10216

Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

NASA Patent Counsel
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